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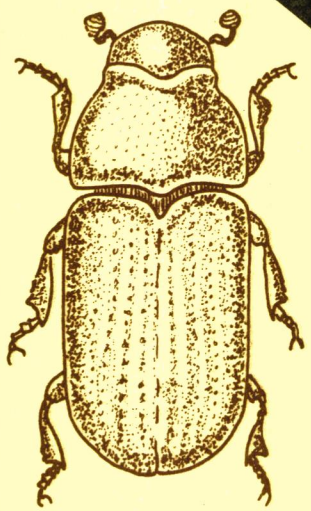
BIOLOGICAL EVALUATION
Insect and Disease Conditions

Big Bend National Park
Texas

1975



Southwestern Region

U. S. DEPARTMENT OF AGRICULTURE

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BIOLOGICAL EVALUATION
Insect and Disease Conditions

Big Bend National Park
Texas

Forest Insect and Disease Management
State and Private Forestry
Southwestern Region, Forest Service, USDA
517 Gold Avenue, SW
Albuquerque, New Mexico 87102

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Prepared By:

James W. Walters

JAMES W. WALTERS, Plant Pathologist
Forest Insect and Disease Management

Donald D. Lucht

DONALD D. LUCHT, Entomologist
Forest Insect and Disease Management

APPROVED BY:

Donald P. Graham

DONALD P. GRAHAM, Director
Forest Insect and Disease Management

Thomas G. Schmeckpeper Jr.

THOMAS G. SCHMECKPEPER
Deputy Regional Forester
State and Private Forestry

INTRODUCTION

On May 13-14, 1975, several insect and/or disease problems were examined on trees in Big Bend National Park, Texas. Field examinations were made by the following personnel: Don Lucht and Jim Walters from the Forest Insect and Disease Management Staff Unit, Southwestern Region, U.S. Forest Service; Hank La Sala from the Southwest Region, National Park Service; Bob DeVine and Bud Phillips from Big Bend National Park, National Park Service.

The purpose of field examinations was to re-evaluate cottonwood mortality previously attributed to Cytospora chrysosperma (R-3 73-10). Also, general insect and disease conditions within the Park were evaluated. Background information relative to tree mortality in the Park is available in previous biological evaluations (R-3 73-10; R-3 75-30).

Numerous diseases were located within the Park. Field examinations at two locations, the Basin area and Rio Grande Village area, revealed branch and tree mortality on several tree species. A summary of results from field examinations follows.

BASIN AREA

1. Problem: Mexican pinyon (Pinus cembroides) branch and tree mortality; mortality was scattered with the exception of one group of about 20 trees; pinyon trees on about 10 acres were affected.

Symptoms and Causal Agents: Dead trees were infested with termites at the base of the tree which often resulted in blowdown of infested trees; foliage was discolored and the needles are being examined in the laboratory for presence of a foliage disease; burrows about 6 inches in diameter were found beneath fading pinyons, and their mortality can be attributed to animal damage.

Recommendations: Additional field examination will be required to diagnose the cause of pinyon branch and tree mortality; the animal damage was quite localized and no action is recommended.

2. Problem: Scattered branch mortality on oak trees (species undetermined).

Symptoms and Causal Agents: Stained xylem was associated with branch mortality; wounds, either natural (such as hail damage) or insect-caused, were associated with stained areas.

Recommendations: Since branch mortality was quite localized, adverse effects on the trees will be limited and no action appears necessary.

3. Problem: Branch mortality on juniper trees (Juniperus deppeana, J. flaccida, J. monosperma, J. pinchotii).

Symptoms and Causal Agents: Flagging is a natural occurrence on junipers, especially in a hot, dry environment; also, scale insects caused flagging on several junipers.

Recommendations: No action is recommended.

RIO GRANDE VILLAGE AREA

1. Problem: Mortality of newly-planted cottonwoods (species uncertain).

Symptoms and Causal Agents: Mechanical wounding, improper planting, and excessive pruning resulted in poor survival of new plantings (Fig. 1); also, shoot blight was present on much of the remaining new growth of transplanted cottonwoods (Fig. 2); this disease may be caused by several species of fungi, but probably is a result of infection by Venturia tremulae which is common on cottonwoods; samples will be taken in late summer for positive identification of the Venturia species.

Recommendations: The following items should improve transplant survival:

a. Avoid mechanical wounding of transplants.

b. Reduce or eliminate pruning of transplants.

c. Remove dead and dying cottonwoods and willows from the planting area; also, prune and destroy dead branches of cottonwoods and willows in planting area.

d. Treat stumps of cut cottonwoods and willows to eliminate sprouting (commercial products are available for stump treatment).

e. Improve tamping procedure to avoid air pockets around plantings.

f. Plant Rio Grande cottonwoods (Populus wislizenii), as they are less susceptible to Cytospora chrysosperma.

g. Develop a tree maintenance program for plantings.

Fig. 1.--Mechanical wounding, improper planting, and excessive pruning contributed to mortality of newly planted cottonwood.

Fig. 2.--Shoot blight on cottonwood caused by Venturia tremulae.

2. Problem: Branch and tree mortality of cottonwood and willow trees (Populus balsamifera and undetermined willow species).

Symptoms and Causal Agents: Branch and tree mortality was caused by Cytospora chrysosperma (Fig. 3 and 4); this fungus enters the tree through bark wounds; natural, mechanical, and insect-caused wounds were present on infected trees; insect wounds resulting from egg deposition by cicadas may be an important factor in spread of Cytospora on cottonwoods and willows in the Rio Grande Village area.

Recommendations: Avoid mechanical wounds to cottonwood and willow trees; remove and destroy dead and dying cottonwood and willow trees; also, prune and destroy dead branches of cottonwood and willow trees.

3. Problem: Leaf and branch chlorosis on planted locust trees (Robinia pseudoacacia); also, true mistletoe infections on locust trees.

Symptoms and Causal Agents: Chlorosis of terminal portion of locust leaves and leaflets; no causal agent could be determined relative to the chlorosis; true mistletoe, Phoradendron californicum, was spreading into planted locust trees from nearby mistletoe-infected mesquite trees.

Recommendations: Since the cause of leaf chlorosis could not be determined, control measures cannot be recommended at the present time; substantial increases in leaf mortality should be reported to the Forest Insect and Disease Management Staff Unit; spread of true mistletoe will continue via birds feeding on mistletoe berries; branch infections on planted locust trees may be pruned and heavily-infected trees should be removed; mistletoe shoots also may be broken off at 2- to 3-year intervals to reduce spread of the parasite.

4. Problem: Leaf and branch mortality on American sycamore (Platanus occidentalis) trees.

Symptoms and Causal Agents: Leaf and branch mortality appears to be caused by sycamore anthracnose, Gnomonia veneta (Fig. 5); however, spores from infected branches must be collected for positive identification of the disease.

Recommendations: Spores will be collected during or after the rainy season and identification of the causal agent will be made; control measures will be recommended at that time.

Fig. 3.--Branch mortality on cottonwood caused by Cytospora chrysosperma.

Fig. 4.--Branch mortality on willow caused by Cytospora chrysosperma.

Fig. 5.--Branch mortality of sycamore caused by sycamore anthracnose, Gnomonia veneta.

5. Problem: Competing vegetation and insect-disease problems in the nursery site.

Symptoms and Causal Agents: The nursery site was sustaining substantial amounts of competing vegetation, especially Bermuda grass.

Recommendations: The nursery site at Rio Grande Village should be fumigated with methyl bromide before any nursery stock is planted. Fumigation is necessary to rid the site of Bermuda grass and other vegetation growing in competition with the desired stock. The fumigation program may be carried out as follows:

Soil Preparation: The soil should be rototilled or otherwise worked into a fine loose condition. The soil must be moist. Too dry or too wet conditions will reduce the penetration and effectiveness of the fumigant. Air temperatures should be above 60 degrees fahrenheit.

Application - Pre-plant Application Only: Dig a shallow trench, about 6 inches deep, around an area slightly smaller than the plastic cover. Place applicator tubes into evaporating pans with the ends extending beyond the edge of the plastic cover. Place cardboard or wooden boxes so as to hold the cover 6 to 12 inches above the soil surface. Place the plastic cover over the area with the edge in the trench. Seal by covering the edge with soil. The fumigant is applied with a special can opener-type applicator (MC-2) which carries the gas through a plastic tubing under the cover to the evaporating pans. Expose for 48 to 96 hours. Aerate 5 to 10 days before planting.

Dosage: One pound of 98 percent methyl bromide per 100 square feet (98% material has 2% chloropicrin added for odor).

Materials needed for application:

a. Methyl bromide to treat at the rate of 1 pound per 100 square feet.

b. Two rolls of 4- or 6-mil clear polyethylene sheeting, 20X100 feet.

c. Plastic tubing or $\frac{1}{2}$-inch garden hose.

d. One MC-2 applicator.

e. Boxes.

f. Evaporating pans.

Caution: Methyl bromide is a colorless, odorless, non-flammable gas; a liquid under pressure. Only trained personnel should use, and label instructions should strictly followed. Very good penetrant. Avoid inhalation and skin contact.

SUMMARY

Assistance in implementing recommendations may be obtained from the Forest Insect and Disease Management Staff Unit, Southwestern Region, U.S. Forest Service. Additional study of insect and/or disease problems in the Park is planned by Forest Insect and Disease Management personnel during late summer.

LITERATURE CITED

Loomis, R. C. 1972. Biological evaluation, cottonwood mortality, National Park Service, Big Bend National Park, Texas, R-3 73-10, 6 p.

Graham, D. P. 1975. Biological evaluation, National Park Service, Big Bend National Park, Texas, R-3 75-30. 3 p. (Unpublished office report).